

REMARKS

In response to the Official Action mailed June 17, 2003, Applicants amend their application and request reconsideration. No claims are added or cancelled so that claims 1-4 remain pending.

Although not required by the Examiner, a "prior art" label is added to Figures 1-3 in the attached replacement drawings.

Independent claims 1 and 3 have, in their first paragraphs, been misinterpreted and interpreted in a way that that is contrary to the disclosure of the patent application. In Figure 1, element 2 is a transformer. In Figures 4 and 7, element 22 is a corresponding transformer. The synchronous machine, namely a generator, is element 1 in Figure 1 and is element 21 in Figures 4 and 6. It is apparent from the description in the patent application and these figures that the output power generated by the synchronous machine is connected through a transformer to a transmission line. That arrangement is expressly described in claims 1 and 3. The Examiner has apparently and erroneously concluded that the antecedent of the phrase "which is" in claim 1 is the voltage detecting means. (It is not apparent what interpretation has been made with respect to claim 3.) That interpretation would only be correct if the punctuation of the first paragraphs of claims 1 and 3 were different from the examined claims.

The invention concerns an apparatus and a method for controlling the excitation of a synchronous machine, particularly a generator that is connected to a power grid, i.e., a power transmission system. The apparatus that is claimed includes respective detectors for detecting the voltage at the output terminal of the synchronous machine and the reactive current produced by the synchronous machine at any given time. This measured information is supplied to a voltage setting means that establishes a reference voltage as the voltage to be produced at the output terminal of the synchronous machine. That reference voltage is based upon the reactive current that is measured, a reference voltage at the output side of the transformer that is connected to the power transmission system, and a phase compensation transfer function. As explained in the patent application, the phase compensation transfer function enables the claimed apparatus to recover from a fluctuation in voltage of the system more quickly than if this transfer function is not present. Based upon an error signal, namely the difference between the reference voltage established for the output terminal of the synchronous machine and the actual voltage at the output terminal of the synchronous machine, a control adjusts the excitation of the synchronous machine. The excitation is typically the magnitude and/or phase of the

current supplied to windings of the synchronous machine that is responsible, together with the rotation of the rotor of the synchronous machine, for providing the power output from the machine.

The method claimed in claims 3 and 4 is analogous to the apparatus claimed in claims 1 and 2.

Claims 1-4 were rejected as anticipated by Frierdich et al. (U.S. Patent 4,264,856, hereinafter Frierdich). This rejection is respectfully traversed.

It is fundamental that to anticipate a claim a publication must disclose every element of the claim. Frierdich does not even come close to disclosing the elements of claims 1-4.

In rejecting claims 1 and 2, the Official Action sets out at pages 2 and 3 the grounds for the rejection. With regard to the first element of claim 1, the Examiner states that element 47 in Frierdich is a voltage detecting means that detects the voltage in an output terminal of a synchronous machine, which is connected to a power transmission system "through a transformer (25)". An inspection of Figure 1 of the reference shows that the synchronous machine 11, excited by a coil 21, has output lines 13, 15, and 17. What those output lines are connected to is not described but it is reasonable to assume that they might be connected to a power transmission system. If they are connected to such a system through a transformer, the transformer is never described nor shown in Frierdich.

One winding of the transformer 25, to which the Examiner made reference, is connected across two of those output lines. The other winding of the transformer 25 is connected to power terminals 27 of a regulator 23. In other words, the transformer 25 is a step-down transformer that supplies power to the regulator 23 through the input terminals 27. The regulator 23 is not a power transmission system and Frierdich never suggests it is. The only way the language of the first paragraph of claim 1 could have any relationship to the parts of Figure 1 of Frierdich cited in the Official Action is a misinterpretation of that first paragraph regarding the connection and function of the transformer in the claimed apparatus.

As explained above, the misinterpretation is not attributable to the Applicants because the language of examined claim 1 is unambiguous, particularly when read in combination with the disclosure of the patent application. The first element of claim 1 is missing from Frierdich because the transformer 25 in the reference does not connect the synchronous machine 11 to any power transmission system. Because this element of the claimed invention is missing from Frierdich, claim 1 cannot be anticipated by Frierdich.

In comparing the second paragraph of claim 1 to Frierdich, the Examiner asserted that element 27 in that reference is a reactive current detecting means. This statement is erroneous. As just described, based upon column 2, lines 32-34 of Frierdich, element 27 indicates input power terminals for powering the regulator 23 employed in the apparatus described by Frierdich. Element 27 cannot detect the reactive current produced by the synchronous machine 11. Moreover, not only are the input power terminals 27 of the regulator 23 not a reactive current detecting means, Frierdich does not even use the term "reactive current" nor provide any element that could detect reactive current in the power produced by the generator 11. On that ground, the rejection of claim 1 as anticipated by Frierdich cannot be properly maintained.

The final four lines at page 2 of the Official Action asserting that Frierdich describes the setting of a reference voltage based upon a measured reactive current, a reference voltage, and a phase compensation transfer function is merely a recitation of claim 1. There is no citation to any place within the reference disclosing such elements. A detailed study of the reference indicates there are no corresponding elements anywhere in Frierdich.

The voltage setting means of the third paragraph of claim 1, which is employed to set the reference voltage at an output terminal of the synchronous machine, so that there is a baseline for calculating an error voltage, was compared by the Examiner to the voltage boosting stages 41, 43, and 45 of Frierdich. As explained in that patent, based upon the currents flowing in the respective output phases of the generator 11, the units 41, 43, and 45 impress upon the field winding 21 voltages that alter the excitation of the generator 11. When excessive current flows in one or more phases of the generator, indicating a fault, the feedback system of Frierdich maintains the high output current for a sufficient period of time to allow clearing of the fault by switchgear or other protective means.

A reference voltage level is set within the sensor 47 of Frierdich using a Zener diode, as shown in Figure 2 of the reference. That diode has a fixed breakdown voltage that establishes a reference voltage. That diode and the sensor 47 in Frierdich do not provide for establishing a reference based upon variable factors, such as the reactive current flowing. In other words, contrary to the assertion of the Official Action, there is no voltage setting means in Frierdich that could possibly correspond to, i.e., anticipate, that element of claim 1.

The final element of claim 1 is a control means. No specific control means within Frierdich was cited in the Official Action as corresponding to this claimed element. According to the Official Action, the exciting system of Frierdich is element 35 shown as

a broken line in Figure 1 of the reference. Within that broken line 35 are elements already cited once by Examiner in attempting to show the presence of other elements of claim 1 in the apparatus of Frierdich. Thus, the rejection with regard to the final element of claim 1 is erroneous because the Examiner has twice counted elements in the reference as corresponding to individual elements of the claimed invention. Moreover, the control means described by Frierdich does not establish an error signal for feedback control based upon a reference voltage set by the voltage setting means of the invention since there is no corresponding element within Frierdich. It follows that there is no control means within Frierdich that could correspond to the final element of claim 1.

To summarize, Frierdich cannot anticipate claim 1 and, therefore, claim 2, because there is no correspondence between what is described in Frierdich and any of the four elements that constitute claim 1. The rejection of claim 1 is legally and factually erroneous so that the rejection of claim 2, a dependent claim, does not require discussion.

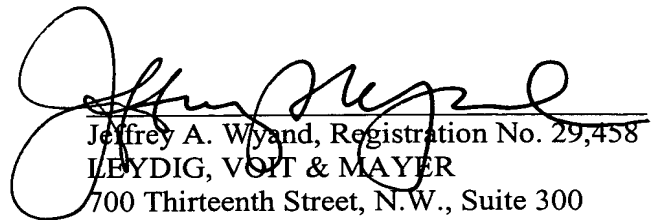
In rejecting the method claims 3 and 4, the Examiner did not set forth any correspondence between particular parts of Frierdich and the steps of those claims. Rather, claim 3 was reproduced in the Official Action and attention was directed to column 3, line 65 to column 5, line 3 of Frierdich as meeting claim 3. With the exception of a few lines, most of the cited passage of Frierdich is directed to the specific circuitry illustrated in Figures 2 and 2A of Frierdich and has nothing to do with how Frierdich's apparatus operates, i.e., a method like that claimed in claims 3 and 4. The passage cited could have pertinence to very detailed apparatus claims, but claims 3 and 4 are method claims to which column 3 of Frierdich would seem more pertinent. Even that passage has nothing in common with the method claims for reasons that are analogous to the foregoing discussion with respect to the apparatus claims 1 and 2. The rejection as to claims 3 and 4 is, therefore, erroneous for essentially the same reasons that the rejection of the analogous claims 1 and 2 is erroneous.

Since the rejection is erroneous and no amendment has been made in response to the prior art rejection, any new rejection based upon newly applied prior art or a different legal ground cannot properly be a final rejection.

In re Appln. of Kitamura et al.
Application No. 10/030,986

Reconsideration and allowance of claims 1-4 are appropriate and earnestly
solicited.

Respectfully submitted,


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